DOCUMENT RESUME

ED 364 502 SP 034 730

AUTHOR Price, Elsa C.
TITLE Learning from the Past as We Aim for the Future through Identifying Students' Learning Styles To Improve Teaching/Learning Experiences in College Students.
PUB DATE Aug 91
NOTE 22p.; Paper presented at the Summer Conference of the Association of Teacher Educators (Minot, ND, August 1991).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Cognitive Style; *Cognitive Tests; College Students; *Community Colleges; Group Activities; *Group Experience; *Grouping (Instructional Purposes); Group Structure; Learning Experience; Peer Influence; Student Placement; Two Year Colleges; Two Year College Students
IDENTIFIERS *Diversity (Student); *Group Assessment of Logical Thinking; Sarason Test Anxiety Scale

ABSTRACT

Community college students arrive with a diversity of learning styles, study skills, and test anxiety levels. The study described here was conducted to determine whether activity grouping of students according to learning style (incorporating at least two different styles in each group) contributes to improved student performance. In the spring of 1991, the Group Assessment of Logical Thinking (GALT) and the Test Anxiety Scale (TAS) were administered to 60 first quarter anatomy and physiology students in a community college. The GALT identified the following types of learners: (1) concrete learners--learn best with hands-on experiences; (2) formal learners--have developed analytical reasoning skills; and (3) transitional learners--learn concepts better with verbal instuction accompanying hands-on experiences. At the end of the quarter a posttest was administered and students were asked to complete a questionnaire regarding the activity groups. Results suggest that despite insignificant differences in the pretest and posttest scores, use of the GALT test to identify student's learning style was most informative. Questionnaire respondents felt that working with studerts of different learning styles helped them perceive material in a different way. Several tables display pretest, posttest, and questionnaire data; an appendix provides a copy of the questionnaire. (Contains 16 references.) (LL)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED 364 502

LEARNING FROM THE PAST AS WE AIM FOR THE FUTURE THROUGH IDENTIFYING STUDENTS' LEARNING STYLES TO IMPROVE TEACHING/LEARNING EXPERIENCES IN COLLEGE STUDENTS

BY

ELSA C. PRICE, Ed.D.
WALLACE COMMUNITY COLLEGE
DOTHAN, ALABAMA

SUMMER CONFERENCE
ASSOCIATION OF TEACHER EDUCATORS

MINOT, NORTH DAKOTA
AUGUST 6, 1991

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

E C. Price

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

SP034730

LEARNING FROM THE PAST AS WE AIM FOR THE FUTURE THROUGH IDENTIFYING STUDENTS' LEARNING STYLES TO IMPROVE TEACHING/ LEARNING EXPERIENCES IN COLLEGE STUDENTS

Students arriving on the community college campus come from diverse backgrounds. Many attempting college courses for the first time have never graduated from high school but have received their General Educational Development (GED) certificate. Others have attended vocational-technical high schools and still others have taken advanced subjects considered to be college preparatory classes. Many students upon completing high school have no plans for attending college at that time but later decide to continue their education at the community college level. Still other students attend college after completing military obligations or after their children are grown. Students coming to the classroom with such backgrounds and reasons for attending may have just as much a variety in their cognitive processing techniques resulting in their having a diversity of learning styles, study skills and techniques and test anxiety levels.

There are a variety of available instruments which can be utilized to identify one's learning style including the Learning Style Inventory (Kolb, 1976) and the Gregorc's Cognitive Style Delineator (Gregorc, 1982) both of which can be used in academic and career counseling. The Learning and Study Strategies Inventory (LASSI) (Weinstein, et. al., 1987) which can be used to assess a Student's learning and study techniques in ten areas is another valuable instrument utilized to assist students. Other

aspects of a student's learning involve the setting and physical needs of the learner. According to Hunt (1979) the amount of structure required by a student can also influence his learning activities and the teaching approaches needed to be most effective. Dunn, et. al. (1979) presented the importance of how a student's physical needs and perception influence his learning. Teaching techniques need to meet those needs such as : using a phonics approach to students who learn through their auditory sense and using experiences such as "tracing words in sand, salt, or on clay (p.49)" to students who learn through their tactile sense were presented. Dunn and Dunn (1979) presented a prescription incorporating student skills with learning style and teaching style characteristics which could be most beneficial if utilized in the classroom.

Students enter science classes quite often with diverse backgrounds, especially students attending community colleges. With this diversity there may also be an extensive difference in their grasp of basic scientific concepts quite possibly due to their differences in developmental levels. Their cognitive level may not allow them to reason in a variety of ways. According to Roadrangka, et. al. (1983) one way to overcome this learning obstacle is "to match instructions and curriculum materials with the cognitive development level of the students (p.1)."

To assess the developmental levels of the students Roadrangka, et. al. (1983) developed a paper and pencil test following Piaget's theory of cognitive development, the GALT (Group Assessment Logical Thinking).

This instrument identifies the students' learning styles then the teacher can adapt classroom presentations to suit those learning styles thereby enabling students to understand scientific concepts and increase their reasoning abilities.

Some of the characteristics of the GALT include:

1. The test measures six Logical operations: conservation, proportional reasoning, controlling variables, combinational reasoning, probabilistic reasoning, and correlational reasoning;
2. The test uses a multiple-choice format for presenting options for answers as well as the justification or reason for that answer;
3. Pictorial representations of real objects are employed in all test items;
4. The test is suitable for students reading at the sixth grade level or higher:
5. The test has sufficient reliability and validity to distinguish between groups of students at concrete, transitional, and formal stages of development; and,
6. The test can be administered in one class period to a large group by individuals who serve simply as proctors (Roadrangka, et. al., 1983).

In their development of the GALT, Roadrangka, et. al. (1983) noted that there was a general increase in cognitive ability with grade and age increase but that "the majority of middle school students exhibit conservation skills and are weakest on probabilistic and correlational reasoning. High school students have gain in these skills but show the same pattern of weaknesses. The majority of college students exhibit probabilistic reasoning skills" (p. 9).

Of the many students interviewed and tested with the GALT by Roadrangka, et. al. (1983), more than fifty percent were concrete learners. Several suggestions were given to help teach concrete learners. These suggestions include working with the concrete learner in the following areas:

I. Organizing Information
   - A. Note-Taking
   - B. Obtaining material form texts
     1. Overview
     2. Identification of information/ideas
        - a. sequencing of events
        - b. causal relationships
        - c. listing without order
        - d. comparing information
        - e. defining terms

II. Assimilating Information
   - A. Computer Assisted Instruction
     1. Tutorials
     2. Simulations

3. Reviews, Sample Tests, Study Guides
4. Word processing
5. Collecting and analyzing data

B. Cooperative Learning (Peer Modeling)
1. Peer Matching By Level Of Reasoning Ability
2. Time On Task
3. Thinking Out Loud

C. Concept Mapping
1. Individual
2. Small Groups

D. Problem Solving and Comprehension
1. Problem Translation
2. Problem Integration
3. Solution Planning and Monitoring
4. Solution Execution (Roadrangka, et. al., 1983.)

Research Questions

The investigation was designed to answer the following research questions:

1. Did grouping students into activity groups according to their learning styles contribute to each student's performance on the Galt test when the posttest GAlT score was compare to the pretest GALT score?
2. Did grouping students into activity groups with students representing at least two different

learning styles as identified by the GALT, contribute to a reduction in each student's test anxiety score upon comparing the pretest TAS to the posttest TAS?

The research questions lead to two null hypotheses:

1. There will be no significant difference between the means on the student's pretest and posttest scores on the TAS as a result of grouping the students in activity groups in which at least two different learning styles are represented.
2. There will be no significant difference between the means on the student's pretest and posttest scores on the GALT as a result of grouping the students in activity groups in which at least two different learning styles are represented.

Use of the GALT to Group Community College Science Students

The GALT was Administered to 60 first quarter anatomy and physiology (Biology 201) students at the beginning of spring quarter (March) 1991 attending a southeast Alabama community college. Students were also given the 16 item Test Anxiety Scale (TAS) by Sarason (1978) to measure their level of test anxiety. On the basis of the Galt the students were placed into activity groups so that at least two of the learning styles were represented in each group. Whenever possible all three learning styles were represented in each group. The author explained to the students that the learning styles of concrete, transitional, and formal were just ways that one perceives and processes information. A concrete learner learns best with more "hands-on" experiences, a formal

learner has developed many analytical reasoning skills and the transitional learner learns many concepts better with verbal instruction accompanying "hands-on" experiences. She further explained that the three styles did not represent "bad, better, and best" nor did they represent grades: C, B, or A. The students were informed that there would be no stigma regrading one's learning style. By being informed of his/her learning style the student would be able to more efficiently study and prepare assignments. By gaining knowledge of his/her learning style the learning experience would be enhanced and perhaps test anxiety levels would be reduced even though the students were not participating in a stress management workshop and/or a test-taking skills workshop (Geier, 1986). The author further instructed the students that by knowing their learning styles she would be able to present the materials in a more meaningful way suited to their particular style.

Throughout the quarter during the laboratory periods the groups worked together on a variety of learning experiences. Some of the activities accomplished by the groups were the completion of a take-home review lecture test covering material in the prerequisite general biology course, studying anatomical models assigned--for example models of skeletal, smooth and cardiac muscle. Other projects accomplished by the groups included completion, during the laboratory period, of review laboratory examinations.

Several studies have shown the importance of group work or team work in enhancing students' learning. Basili and Sanford

(1991) utilized groups in an effort to improve student's understanding on scientific concepts and to clarify community college science students' misconceptions. Jones and Steinbrink (1991) reported on the successful use of home teams in elementary science classes. Chambers and Abrami (1991) used an aspect of cooperative learning with the purpose of their study being "to determine the relationship between team outcome and student achievement and beliefs" (P.140). They reported that students rated the importance of effort the highest of all the factors followed by ability, luck, and task difficulty (Chambers and Abrami, p. 145).

At the end of the spring quarter the GALT (Roadrangka et. al., 1983) and the TAS (Sarason, I. Ganzer, V. 1962: Richardson, F., O'Neil, Jr., H., Whitmore, S. and Judd, W., 1977; and Sarason, 1978) were administered to the students as well as a questionnaire (Appendix A) regarding the Activity groups. The results of the pretest and the posttest for GALT are given in Table 1. The TAS pretest and posttest results are given in Table 2. Table 3 contains statistical data concerning the GALT while Table 4 contains statistical data for the TAS. Results of the Learning Styles Questionnaire are given in Table 5.

The data was analyzed statistically using the student's test at the .05 significance level. The results of the tests for both the Galt and TAS are presented in Table 3 and 4. There was no significant difference between the means for either the GALT or the TAS: therefore, neither null hypothesis was rejected.

Discussion

Use of the GALT test to identify the student's learning style was most informative even though the differences in the pretest and the posttest scores were not significant. According to the questionnaire results over 50% of the students agreed with the results of the GALT and by working in activity groups whose members represented at least two learning styles were able to perceive the assigned material in a different way and were able to meet other students in the class much sooner.

In general student's were very receptive to the grouping concept. Several students made comments on the questionnaires most of which were of a positive nature regarding grouping. There were a few negative statements some of which will be useful in making adjustments for further research. Excerpts from the comments include the following:

> "I think it is very rewarding to group students together. It can help students to meet different people and they may pick up different learning styles."
>
> "Good environment for learning. O.K."
>
> "The GALT test was beneficial to me. By identifying my learning style, I could see the importance of getting ideas from people with different styles of learning. It was also helpful to realize my anxiety level so I can learn to approach test-taking differently."
>
> "I enjoyed the grouping because it made studying FUN."

"Seeing another's point of view helped me see the subject matter clearly."

"It helped build a whole class 'feel' rather than 20 individuals facing the vast material alone.

"The togetherness has increased, but it did not help me to study. I study best alone".

"I liked working in groups because it helped me gain a little confidence in what I was learning and provided a quick way to get involved with the others in the group."

"It was very beneficial to me because if I couldn't figure out a question the other people would work it out with me."

"I believe working with other individuals helps, especially in the lab class. Out of class I need to study alone because I feel I get more accomplished."

"We began with a group of six. I feel that this is too large a number for the space allotted. I think a smaller group with a maximum of four would be better for me."

"I do think working in groups of three would be ideal, enough discrepancy in opinion to be stimulating, but not so many opinions as to `muddy' the waters."

Recommendations

In future research using the GALT test results the author recommends:

1. When administering the GALT give the students plenty of time to complete the GALT at one sitting, preferably not following an examination when they are tired.
2. Once the Galt is scored work with individual students explaining the student's style in learning the materials assigned.
3. Give many different experiences in which the students are assigned to their activity group.
4. Give the students an opportunity to form their own activity groups (as long as at least two different learning styles are represented), as well as assign members to specific groups.
5. Give the student TIME to work in their activity groups.

Bibliography

Atkinson, G. (1991). Kolb's Learning Style Inventory: A Practitioner's Perspective. Measurement and Evaluation in Counseling and Development. 23:149-161

Basili, P. and Sanford, J. (1991). Conceptual change strategies and cooperative group work in chemistry. Journal of Research in Science Teaching 28(4):293-304.

Bennett, W. (1987) Teacher Expectations. In What works: Research About Teaching and Learning. (2nd Ed.) United States Department of Education. Washington, D.C.

Bennett, W. (1987) Cooperative Learning. In What Works: Research about Teaching and Learning. (2nd Ed.) United States Department of Education. Washington, D.C.

Chambers, B. and Abrami P. (1991). The relationship between student team learning outcomes and achievement, causal attributions, and affect. Journal of Educational Psychology. 83 (10: 140-146

Dunn, R., Dunn, K. and Price, G. (1979). Identifying Individual Styles. In Student learning Styles. National Association of Secondary School Principals, 1904 Association Drive, Reston, Virginia 22091.

Dunn, R. and Dunn, K. (1979). Using Learning Style Data to Develop Student Prescriptions. In Student Learning Styles. National Association of Secondary School Principals, 1904 Association Drive, Reston, Virginia 22091.

Geier, E. (1986). The effectiveness of stress management and test-raking workshops in reducing test anxiety scores of community college students. Doctoral dissertation. Auburn University: Auburn, Alabama.

Hunt, D. (1979). Learning Style and Student Needs: An Introduction to Conceptual Level. In Student Learning Styles. National Association of Secondary School Principals, 1904 Association Drive, Reston, Virginia 22091.

Jones, R. and Steinbrink, J (1991). Home teams: Cooperative learning in elementary science. School Science and Mathematics. 91 (4):139-143.

O'Brien, T. (1991). Relationships among selected characteristics of college students and cognitive style preference. College Student Journal 25:492-500.

Osterman, D., Christensen, M. and Coffey, B. (1985). The Feedback Lecture. In Idea paper No.13.. Center for Faculty Evaluation & Development-Division of Continuing Education: Kansas State University.

Richardson, F., O'Neil, Jr., H., Whitmore, S. and Judd, W., (1977). Factor analysis of the test anxiety scales and evidence concerning the components of test anxiety. Journal of Consulting and Clinical Psychology. 45 (4), 704-705.

Roadrangka, V., Yeany, R., & Padilla, M., (1993). The Construction and Validation of Group Assessment of Logical Thinking. Paper presented at the annual meeting of the National Association For Research in Science Teaching. Dallas, Texas. April 1983.

Sarason, I. and Ganzer, V. (1962). Anxiety, reinforcement, and experimental instructions in a free verbalization situation. Journal of Abnormal and Social Psychology. 65, 300-307.

Weinstein, c. Palmer, D. &Schulte, A. (1987) The Learning and Study Strategies Inventory (LASSI). H&H Publishing Company, Inc., Kapp Drive, Clearwater, FL. 34625.

APPENDIX A

LEARNING STYLES QUESTIONNAIRE

Key: A=Strongly Agree, B=Moderately Agree, C=Slightly Agree
D=Slightly Disagree, E=Moderately Disagree, F=Strongly Disagree

Circle each answer as it best applies to you and your situation.

---

1. Finding out about my learning style was important to me. A B C D E F

2. The Galt Test helped me identify my learning style. A B C D E F
3. I agree with the results of the Galt Test. A B C D E F

4. Working with other students of different learning styles helped me perceive the material in a different way. A B C D E F

5. The lab experiences were beneficial to me when I worked with someone who had a different learning style. A B C D E F

6. I was able to meet other students in the class much sooner by working in small groups than by not working in small groups. A B C D E F

7. I was able to form a study group or found a study partner with whom I work outside of class as a result of the instructor asking us to work in small groups. A B C D E F

8. Answering the review lab test questions was more beneficial to me when I worked with another student. A B C D E F

9. I prefer to study alone in lab. A B C D E F

I0. When studying the models in the lab I learned more when working with another person regardless of their learning styles. A B C D E F

11. I learned more in the lab when working with someone whose learning style was different to mine. A B C D E F

12. Working in the lab with a group of people whose learning styles were different to mine was beneficial to me. A B C D E F

13. My lecture test anxiety was reduced when I worked with a group of people with different learning styles. A B C D E F

14. Working with someone of a different learning style helped to reduce my lecture test anxiety. A B C D E F

15. Working in groups helped reduce my pop-test anxiety. A B C D E F

16. My pop-test anxiety was reduce when I worked with an individual whose learning style differ from mine. A B C D E F

17. Working with someone of a different learning style helped to reduce my lab test anxiety. A B C D E F

18. My lab test anxiety was reduce when I worked with a group of people with different learning styles. A B C D E F

19. Working in groups increased my Anxiety. A B C D E F

20. I prefer to study lecture material by myself. A B C D E F

Tables

Table 1

GALT TEST RESULTS

PRETEST (BEGINNING OF SPRING QUARTER)

	CONCRETE (0-4)	TRANSITIONAL (5-8)	FORMAL (9-12)
GROUP 1	10	9	6
GROUP 2	4	8	3
GROUP 3	4	10	6
TOTAL	18	27	15

N=60

POSTTEST (END OF SPRING QUARTER)
N=60

	CONCRETE (0-4)	TRANSITIONAL (5-8)	FORMAL (9-12)
GROUP 1	13	7	5
GROUP 2	6	6	3
GROUP 3	6	4	9
TOTAL	25	17	17

TABLE 2

RESULTS FOR THE TAS
PRETEST (BEGINNING OF SPRING QUARTER 1991)
N=60

	LOW (0-2)	MEDIUM (3-8)	HIGH (9-16)
GROUP 1	0	7	18
GROUP 2	2	3	11
GROUP 3	0	13	6
TOTAL	2	23	35

RESULTS OF TAS
POSTTEST (GIVEN AT THE END OF SPRING QUARTER)
N=60

	LOW (0-2)	MEDIUM (3-8)	HIGH (9-16)
GROUP 1	0	7	18
GROUP 2	3	9	4
GROUP 3	1	12	6
TOTAL	4	28	28

TABLE 3

STATISTICAL DATA

GALT

PRETEST	POSTTEST
N=60	N=60
MEAN=5.983	MEAN=5.833
MODE=5	MODE=4
MEDIAN=5.1	MEDIAN=5.33
STANDARD DEVIATION=1.8639	STANDARD DEVIATION=2.8592
VARIANCE=3.4743	VARIANCE=8.1751
MINIMUM SCORE=1	MINIMUM SCORE=1
MAXIMUM SCORE=12	MAXIMUM SCORE=12
RANGE=11	RANGE=12
GALT t=.2039082	
(NOT SIGNIFICANT)	